

Claims

What is Claimed is:

- 5 1. Polyurethaneurea resins comprising at least one group of the formula (I)

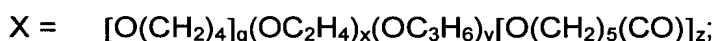


or at least one group of the formula (II)



- 10 $\{\text{O}(\text{CO})\text{CHR}^2\text{CH}_2\text{N}[\text{C}_n\text{H}_{2n}\text{Si}(\text{OR}^3)_3](\text{CO})\text{NH}-\}_c \quad (\text{II})$ or any mixtures of (I) and (II);

wherein



q = 0 to 10;

15 x = 0 to 20;

y = 0 to 20;

z = 0 to 10;

n = 2 or 3;

a = 1 or 2;

20 b = 0 to 4;

c = 1 to 5;

$\text{R}^1 = -\text{C}_2\text{H}_4-, -\text{C}_3\text{H}_6-, -\text{C}_4\text{H}_8-, -\text{CH}(\text{CH}_2\text{O}(\text{CO})\text{R}^5)\text{CH}_2-$ or
 $-\text{CH}_2\text{CH}(\text{O}(\text{CO})\text{R}^5)\text{CH}_2-$;

$\text{R}^2 = \text{H}$ or CH_3 ;

25 $\text{R}^3 = \text{C1 to C4 alkyl}$;

$\text{R}^4 = a+b+c$ -valent, saturated hydrocarbon residue of a (cyclo)alkane polyol with $a+b+c$ hydroxyl groups;

$\text{R}^5 =$ an acid residue of a monocarboxylic acid,

with the proviso that $a+b+c = 3$ to 6 and wherein the sequence of the

30 subformulae indicated q, x, y and z may be varied at will and q, x, y and z in

each case merely state the number of instances of the particular subformulae contained in the formulae (I) and (II).

2. The polyurethaneurea resins of claim 1, wherein groups (I) or (II) or (I)
5 and (II) are present in an amount corresponding to a silicon content of 1.4 to 5 wt. %.

3. The polyurethaneurea resins of claim 1, wherein the polyurethaneurea
10 resins contain at least one further functional group in addition to groups (I) and/or (II).

4. The polyurethaneurea resins of claim 3, wherein the at least one further
functional group is selected from the group consisting of isocyanate groups,
carboxyl groups, (meth)acryloyl groups, hydroxyl groups and trialkoxysilane
15 functions which are present other than as a constituent of groups (I) or (II).

5. A process for the production of the polyurethaneurea resins of claim 1
comprising the successive steps:

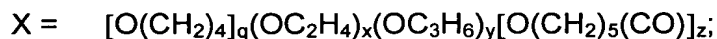
a) reaction of an aminoalkyltrialkoxysilane comprising a primary amino
20 group with at least one compound selected from the group consisting of
compounds of the formula (III)



and compounds of the formula (IV)



25 wherein



q = 0 to 10;

x = 0 to 20;

y = 0 to 20;

30 z = 0 to 10;

n = 2 to 3;

a = 1 or 2;

b = 0 to 4;

c = 1 to 5;

$R^1 = -C_2H_4-, -C_3H_6-, -C_4H_8-, -CH(CH_2O(CO)R^5)CH_2-$ or

5 $-CH_2CH(O(CO)R^5)CH_2-$;

$R^2 = H$ or CH_3 ;

$R^3 = C1$ to $C4$ alkyl;

$R^4 = a+b+c$ -valent, saturated hydrocarbon residue of a (cyclo)alkane polyol with $a+b+c$ hydroxyl groups;

10 $R^5 =$ acid residue of a monocarboxylic acid, with the proviso that $a+b+c = 3$ to 6 and wherein the sequence of the subformulae indicated q, x, y and z may be varied at will and q, x, y and z in each case merely state the number of instances of the particular subformulae contained in the formulae (III) and (IV), to form at least one simultaneously hydroxy-, secondary amino- and

15 trialkoxysilane-functional preadduct,

b) reaction of the at least one preadduct formed in step a) with an isocyanate component selected from the group consisting of polyisocyanate, isocyanate-functional polyurethane prepolymer, isocyanate-functional polyurethaneurea prepolymer and combinations thereof with consumption of

20 the hydroxyl and secondary amino groups of the at least one preadduct.

6. A process for the production of the polyurethaneurea resins of claim 1 comprising the successive steps:

a) reaction of an isocyanate component selected from the group consisting of polyisocyanate, isocyanate-functional polyurethane prepolymer, isocyanate-functional polyurethaneurea prepolymer and combinations thereof with at least one compound selected from the group consisting of compounds of the formula (III)

25



30 and compounds of the formula (IV)



wherein

$X = [O(CH_2)_4]_q(OC_2H_4)_x(OC_3H_6)_y[O(CH_2)_5(CO)]_z$;

$q = 0$ to 10 ;

$x = 0$ to 20 ;

5 $y = 0$ to 20 ;

$z = 0$ to 10 ;

$n = 2$ or 3 ;

$a = 1$ or 2 ;

$b = 0$ to 4 ;

10 $c = 1$ to 5 ;

$R^1 = -C_2H_4-$, $-C_3H_6-$, $-C_4H_8-$, $-\text{CH}(\text{CH}_2\text{O}(\text{CO})R^5)\text{CH}_2-$ or
 $-\text{CH}_2\text{CH}(\text{O}(\text{CO})R^5)\text{CH}_2-$;

$R^2 = \text{H}$ or CH_3 ;

$R^3 = \text{C1 to C4 alkyl}$;

15 $R^4 = a+b+c$ -valent, saturated hydrocarbon residue of a (cyclo)alkane polyol
 with $a+b+c$ hydroxyl groups;

$R^5 =$ acid residue of a monocarboxylic acid,

with the proviso that $a+b+c = 3$ to 6 and wherein the sequence of the
 subformulae indicated q , x , y and z may be varied at will and q , x , y and z in

20 each case merely state the number of instances of the particular subformulae
 contained in the formulae (III) and (IV)

with consumption of the isocyanate groups,

b) addition of aminoalkyltrialkoxysilane with the nucleophilic primary
 amino group onto (meth)acryloyl groups of the reaction product obtained in
 25 step a) with complete consumption of the primary amino groups and
 conversion into secondary amino groups,

c) reaction of the reaction product obtained in step b) with a further
 isocyanate component selected from the group consisting of polyisocyanate,
 isocyanate-functional polyurethane prepolymer, isocyanate-functional
 30 polyurethaneurea prepolymer and combinations thereof with formation of urea
 bridges.

7. Compositions containing at least one polyurethaneurea resin of claim 1.
8. The compositions of claim 7 selected from the group consisting of adhesives, sealants and coating compositions.